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# RAILWAY PROFESSIONAL EDUCATION, ITS OBJECTS AND LIMITATIONS<sup>1</sup>

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Let me say at the outset how much pleasure it gives me to be here to-night. I believe that I was the first person who ever delivered a lecture on a specifically railway subject in an English University. That was, as far as I remember, about 14 years ago, before a University Extension audience at Oxford. About 10 years ago, when the London School of Economics, which since then has become a School of the reorganized London University, was founded, I began to lecture there on Railway Economics, and till this present session I have lectured there ever since. That branch of the work of the School is now, I hope, established on a permanent basis. Birmingham and Manchester have followed suit within the last year or two, and I had the pleasure of speaking only last week in the latter University to an audience of about 200 people, who were apparently interested in a subject which I am bound to say did not fall quite strictly within the definition of what the Germans call *Brodstudien*. Now I am glad to see that, in this great city of Liverpool, a city which, more than perhaps any town of its size in the whole world, exists by and for transport, you too have gone and done likewise, and established a series of courses for railway men. Though in this case you cannot make your usual proud boast that, what Lancashire thinks to-day, England will think to-morrow, yet I heartily congratulate you on what you are now doing, and I trust that the Railway School of the Liverpool University will go far and fare well.

One other word of preface. Those who have done me the honour of asking me to come here to-night to address you, have, I trust, done so in full consciousness of the fact that, though I am deeply interested in the subject, I am only entitled to speak to you

<sup>1</sup> A lecture delivered on November 8, 1905, on the inauguration of courses of railway instruction in the School of Commerce of the University of Liverpool.

as an outsider. I have perhaps thought more and cared more about the question of professional education for railway men than most of those who are professionally concerned in the management of our English railways. But to that class I cannot myself claim to belong. If it is always true that a shoemaker ought to stick to his last, I have no right to be here to-night. Please, therefore, believe that in what I shall say to you I represent no one but myself. If you were to go further and believe that a great deal of what I say would be disavowed and contraverted by not a few representatives of the railway interest, I am not sure whether you would be very far away from the fact.

I have undertaken to speak to you about Railway Professional Education. Perhaps, therefore, we ought to begin by considering whether there is, and if not, whether there ought to be such a thing as a railway profession. What is a profession? We all understand, generally, what we mean when we speak of the profession of the law or of medicine, and refuse to describe cotton broking or ship owning or house building as a profession. We realize that the final object of a doctor or a lawyer is something more than the piling up of figures in a fee book. We take it for granted that a doctor, for instance, will put his time and his expensively acquired knowledge at the disposal of the sick poor, without expectation of personal reward. We do not expect the broker or the house builder to forego his normal profit, even though his customer be on the verge of bankruptcy. Without troubling you with dictionary references, I think I may fairly describe a profession as a calling, the members of which, having received a liberal education, are organized, and given as a rule exclusive privileges, mainly for public advantage, and only secondarily for private gain. That English railway men are prepared to rise to the height implied in the second part of this definition — that they accept the position that their first duty is to serve the public, and that their duty to increase their shareholders' dividends comes only in the second place, I am well assured. But I fear it cannot be said at present in this country, that a liberal education, deliberately directed to making young railway men as capable as may be of performing the responsible duties which will be laid upon them, is a matter of course. Our railway management, like our politics, is essentially amateurish. Railway men, as they grow up to occupy more and more responsible situations, have

to rely on their own mother wit, and on such scraps of guidance from the experience of other times and other countries, as they may be able, in the scant leisure of an over-crowded day, to find time to assimilate. In France, or in Germany, or in the United States, it is not so. In Germany the men who are destined for the highest posts in the railway service, begin with a University education, go on to a post-graduate course in law, and only then, at the age of perhaps 24 or 25, begin to specialize in railway subjects proper. In France and in America, a degree in engineering is normally superimposed on a general liberal education up to the age of 19. In other words, in all three countries, it is assumed that the man who is to bear the responsibility of the management of a great railway organization, must be, first and foremost, a highly educated citizen, trained with special reference to his future career, and only secondarily a specialist in railway matters.

Now I am not going to argue this evening that the foreigners are right. That you and I are here this evening, not in a Board School or in a Public Hall, but in the University of Liverpool, seems to me to admit, as far as we are concerned, that specific railway education must be superimposed on a liberal general education. The questions I wish to invite you to consider are, what the ideal professional education should be, how it is to be given, and to whom. Let me deal with the last point first. A railway is a vast and wide-reaching organism. It employs services of all kinds; but the fact that a man is employed on a railway does not necessarily make him a railway man in the sense with which I am concerned. A railway solicitor is first and foremost a lawyer. The technical knowledge required in taking compulsorily land for a railway is only in details different from the knowledge required to take land for a dock or a water-works undertaking. Prosecuting a man for travelling without a ticket, or being drunk and disorderly on a station, is nothing else but ordinary police court work. An engineer, in so far as he confines himself to building and maintaining bridges, or constructing locomotives and carriages, is no more a member of the railway profession, as I conceive it, than a surgical instrument maker is a doctor, or a printer of Hebrew books a theologian. The man whose education we are concerned with is the potential general manager.

This, of course, rules out the vast bulk of the railway staff. Of the 540,000 men employed on the railways of this country, not many

will ever rise to be general manager. Far be it from me to say anything against systematic instruction in subjects, such as, for instance, signalling or goods invoicing. I only wish to point out that this is technical instruction in a particular trade, not professional instruction such as is required to enable a captain of industry to co-ordinate the work of many trades. Let me say another thing. There are not many general manager's posts, and there never will be, but I only say what many of my railway friends, with better opportunities than I of knowing, think, when I say that, few as the posts are, the men to fill them are even fewer, and the posts of the kind I speak of, not exactly as general managers, but as members of what I may call the headquarters' staff, would even now be more numerous than they are, if it were not for the obvious dearth of candidates qualified by all-round capacity to fill them.

Let us consider then, what should be the training for our ideal general manager. His business, as it seems to me, divides itself into three main categories. In the first place, he stands before the public and the Government departments as the representative of the great organization which we call a railway. In the second place, he is at the head of a great commercial undertaking, gathering in a revenue of five or ten or fifteen millions per annum, by supplying to the public, mainly in retail quantities, the service of transport — a service which, while to him it is mainly one and indivisible appears to them as a vast number of separate and independent units. Lastly, he is the head of a staff of tens of thousands of persons engaged in the multifarious ramifications of the supply of the service which the public require, and is responsible for the vast stock of plant, appliances and material, employed in connection with the rendering of those services. And in this capacity he has to consider, at one moment, the question of the rates of pay and conditions of service of train men or station staff; at another moment, whether larger engines will cost more in permanent way expenses than they save in haulage; or again whether an increase of speed will bring in, in increased receipts, more or less than it causes in increased expenditure.

If this be the general manager's position, what should be the training of what the Germans call the aspirant for it? First, he must know something of political history. He must have a general idea what the relation of the State to private industry and semi-public industries is at present, and has been in the past — an idea,

I mean, such as is given in, for instance, Lord Farrer's book on "The State in Relation to Trade." The constitution of a country, certainly of an Anglo-Saxon country, broadens down slowly from precedent to precedent, and no one, unless he knows the present and the past, is likely to be able to gauge correctly the tendencies of future legislation dealing with the regulation or control of railways. Further, our capacity for generalizing profitably on a subject, and especially on a subject like railways, whose whole history only goes back two generations, is greatly increased, if we check our English ideas by a competent knowledge of what has happened and is happening in foreign countries. All the problems that confront us here and now in England, the question of favoring the foreigner, of giving special rates to encourage agriculture, of preserving to each place what is called "the natural advantage of its geographical situation" — all these questions have a long history and a voluminous literature in foreign countries. Our general managers will be better qualified to deal with them as practical questions in England to-day, if they study — our legislature would have gone less far astray in their Acts of Parliament in the past, if they had studied — the accumulated foreign experience on these points. Here is one topic eminently suitable as a subject for University teaching.

But in addition to what I may call constitutional practice and constitutional law, there is a great body of other law with which the railway manager is intimately concerned. His railway, as a company, is a creature of statute. Its corporate organization, its power to take lands, its relation to the outside public, who meet it, now as adjoining landowners, now as supplying the multifarious articles that it needs to purchase, its rights and liabilities as carrier of goods and passengers, and as an employer — all these, and many more, are subjects that must constantly come under the purview of the manager, and they are certainly subjects on which a reasonable amount of legal knowledge, and a legal attitude of mind, will be of the utmost service. I do not suggest that a manager ought to be a lawyer, though, as I have said, the great bulk of the managers of the German State Railways are lawyers. Still less do I suggest that the manager should concern himself with the detailed work of the solicitor's department. But I do say that the ideal general manager will be a better all-round man if he has imbibed all the legal knowledge that he can possibly find time for.

So far, however, we have only considered one side of his activities. He is secondly, as I said, the head of the commercial organization. Rule-of-thumb rates were all very well in the early days of railroading. In the early days the great thing was to get a reduced rate. Why reduced, and on what principle, nobody cared, as long as it was reduced. But nowadays, when the world has become a single commercial unit, when the imposition of a 2s. duty on corn in England reacts on the railway rates in the far North-West of America, the really vital question is not the quantum of the rate *per se*, but the right relation of the rates *inter se*. If there be anywhere in applied economics a more difficult question than what is an undue preference — speaking, of course, not legally, but economically — I, for one, do not know of it. But how is a manager to decide whether a given rate, or a proposed alteration of rate, is economically justifiable, unless he has some economic generalizations on which to act? Not very long ago, after I had been lecturing on the subject of “What the Traffic Will Bear” at the London School of Economics, a student came to me and said in effect: “What you have been saying is extremely interesting to me. I often have to defend to our customers rates that we are charging. From the railway point of view, I knew I could justify them on the ground of what the traffic would bear; but it never occurred to me that we could defend, from the point of view of the public, the application of this principle.” But in a democratic country, where, in the long run, the most despotic of general managers has to bow to public opinion, how can he defend a rate to the public unless he knows that it is, and how it is, defensible as an economically sound public policy?

I submit, therefore, that our general managers of the future must find time to study the theory of railway rates, must know the history of tariffs and tariff legislation not only in our own but in foreign countries. They must not only feel persuaded that their scheme of rates and fares is reasonable, but they must be prepared to show why they are reasonable and to prove, both by argument and history, that the course which they have adopted is reasonable, and that an alternative course suggested, though it may be more profitable to a particular class or a particular interest, would be less advantageous to the interests of the public as a whole.

Lastly, we have to regard the manager as head of the staff, and

of the operating organization generally. No academic instruction can, I fear, teach the management of men; partly this comes by practice, but mainly it is inborn. But even here a manager would be better equipped for his duties if he had devoted some study to subjects such as, for instance, the organization of trades unions, and methods of industrial remuneration. But leaving out these matters, there is, I think, a great deal that can be learned academically in reference to railway operation. A book like Wellington's "Economics of Railway Location" raises a whole group of questions, any one of which might be a subject, not of a lecture, but of a course, or series of courses. Let me take one or two illustrations. You may carry your traffic between Liverpool and Scotland, either by climbing over the top of Shap Fell, or by tunnelling underneath it. In the former case, you spend more for every ton you carry in engine hire and in wages, and you diminish the carrying capacity of the whole line by a reduction in the speed of your slowest trains. In the latter case, you fasten to all time round the neck of the traffic, the dead weight of the interest implied by the extra cost of the tunnel. Which alternative is to be preferred in any given case, depends, of course, on the special circumstances of the anticipated traffic, its volume, its character, its effective demand for speed and so forth. The problem can, however, be worked out with these factors assumed at any point you like. And the man who has worked out such problems in an academic course is much more likely to arrive at the correct solution, when an individual case is brought before him in practice, than the man who begins *de novo* to deal with the particular instance. Take another instance. Two railway companies, entering London under what appear to an outside observer almost identical conditions, have adopted diametrically opposed principles in the matter of suburban traffic. The one refuses to cater for it altogether; the other has spent millions for its accommodation. Now I do not of course wish to say that either company is right or wrong. But I cannot help thinking that, if one is right, the other is wrong; and I feel pretty sure that neither company has ever justified its policy to itself by anything beyond general impressions. I believe a question of this kind is quite capable of definite scientific treatment. So many acres of land, naturally tributary to a given terminus, can accommodate such and such a population, and that population may be expected to pay so many pounds in fares. To



carry the estimated number of passengers would require so much capital for land and works, so much annual expenditure for operation. With these figures worked out carefully and systematically — not as rough guesses on a half-sheet of paper — the question, whether or no to adopt an extension policy, answers itself. I do not think I am misrepresenting English railway management when I say that, while such detailed estimates would be made, as a matter of course, in any Continental country, they have not been usual in this country in the past.

One point more. There has been a great talk in England of late on the subject of railway statistics. That English railways publish the most meagre statistics of any country in the world — that even the statistics they do publish are mainly worthless, because of their inaccuracy, and, if I may coin a word, because of their incomparability, will hardly be denied. But we are told that the statistics compiled are much more voluminous than the statistics published. I should be the last person to deny it, for I expect I have waded through more cubic feet of private and confidential statistics than most people outside the railway service. But even admitting the voluminousness of our English railway statistics, I would make two observations. In the first place, they are largely useless to anybody, because they are unsystematic and discontinuous. In the second place, so long as they remain “private and confidential,” they are absolutely useless to everybody except the very limited number of persons who are allowed access to them. Assume — and it is a very generous assumption — that to every employee of Company A there are available adequate and scientifically compiled statistics of everything on his own line capable of statistical treatment, even so he will learn from them not half what he might learn, so long as the statistics of Companies B, C, D are not available to him for purposes of comparison. Whatever else our aspirant general manager is not to learn, he must in the future have access to full, scientifically compiled and public statistics of every railway in the country, and he must be taught by trained statisticians how to read them and how to manipulate them so as to extract from them, from time to time, the lessons that they are capable of affording him.

Now, I think, I have sketched the main subjects which, as it seems to me, the Railway Admirable Crichton will require to master. I may be told, no doubt, that time is inexorable, and that I

am asking for more than can possibly be attained in practice. I think not. I think that a man intended for the railway profession could master in a year enough economics, not to become an economist, but to appreciate the bearing of economics upon railway problems; enough politics and law in another year, not to become a statesman or a lawyer, but to understand how railways fit into their place in the general body politic; while I am sure that in a third year he could learn enough engineering to be able to understand, and intelligently criticize, the advice of his engineering experts. I would add further, that, whereas, the complete curriculum I have imagined would be taken by comparatively few men, the different courses would be available and profitable to men intending to devote themselves to other careers. The courses of applied engineering would interest those intended for the engineering profession. Railway law must be to many lawyers an important branch of their own profession; while I can hardly imagine any instruction more useful for our future captains of industry than a course on the Economics and Statistics of Transport. That persons outside the railway world should attend these latter courses, is, I am sure, eminently desirable in the public interest. For, while our railway companies need criticism, the criticism to which they are at present exposed, both in the press and in Parliament, is so wrong-headed, and so ill-informed, that one cannot be surprised if they come in consequence to treat all criticism with the contempt that, in the main, it richly deserves.

How then are railway men to obtain a specialized railway education such as I have suggested? First and foremost, no doubt, by academic instruction. And here one is met at the outset by the knowledge that, however plentiful the harvest may be, the laborers are exceedingly few. English lawyers proverbially pay scant attention to the science of law, and prefer to devote themselves to the practice. How far that is the case with engineering I am not prepared to say. But, if there be any English economist of standing who has devoted any serious attention to the economics of transport, who on that subject is entitled to be listened to alongside of Hadley and Taussig in America, or Colson in France, or Uhlrich and Sax and Cohn in Germany, I confess I have not heard of him. Still, I hope that the demand will ere long stimulate the supply. Meanwhile we must do as best we can, and hope that one at least

of the newer Universities will develop specially on this side. For, while lectures in what I have called railway technical education must of necessity be given locally in the various great centers, there is no reason why those who intend to go in for a complete course of professional education should not all go to a single University, just as men who propose to devote themselves to the higher mathematics naturally tend now to the University of Cambridge.

I have spoken of the need for teachers. The need for books is even more crying. There are plenty of railway books indeed in existence, but the bulk of them are written in French and German, while of those written in English almost all come from America, and presuppose, if they are to be really profitable to a student, a familiar acquaintance with an environment that in the nature of things is strange to an Englishman. I am glad to know that a colleague of mine at the London School of Economics is at present lecturing on the Economics of Railway Location, and I hope, without much expecting, that some day his lectures will be published in permanent form. Meanwhile, is it too much to ask that some one would translate into English some of the foreign works? One of the leading economists in Germany, Professor Gustav Cohn of Göttingen, has devoted years of his life to a study of English railways. Is it too much to ask that some student will, with the encouragement of his University, publish a translation into English of his *Englische Eisenbahnpolitik*? Within the last two or three years a pupil of Professor Cohn's spent many weeks in Lancashire studying the history of the Manchester Ship Canal, and published in the *Archiv für Eisenbahnwesen* an elaborate monograph embodying his researches and conclusions. Is it too much to ask that some student, either in Liverpool or Manchester, should translate it?<sup>2</sup>

But, in a modern and rapidly developing subject like railways, professors and books alike are bound to get rapidly out of date. They need to be supplemented by adequate professional periodical literature. It is difficult to imagine the other professions getting on without the *Lancet* and the *Law Times* and similar publications, issued week by week or month by month, and keeping the practitioner constantly abreast of the newest developments in his pro-

<sup>2</sup> Since this lecture was delivered I have been told that the monograph on the Ship Canal has been translated by a railroad clerk. But it remains in MS. and is, I doubt not, marked "private and confidential."—W. M. A.

fession. The want is recognized and met in the railway profession in other countries. It is not so here. Latterly the *Railroad Gazette*, perhaps the most able and influential publication of its kind in the world, has established an English offshoot, the RAILWAY GAZETTE. Everyone who cares for railroad education must wish it success, but as far as I can see, it is likely to be confronted with three difficulties. In the first place, as English railway men are ardent worshippers of the great goddess Rule-of-Thumb, and in the main disbelieve in the scientific study of their profession, it has comparatively few readers. In the second place, as it cannot publish private and confidential information, and all English information, except the Time Tables, is private and confidential, there is a lack of matter. And in the third place, as no man can make bricks without straw, there is a lack of writers. I hope and believe, however, that this difficulty is coming to an end, and that there is a concurrent development going on — steady, if not rapid — under all three heads — of readers, writers and matter.

Equally important with the development of an adequate professional press is the establishment of railway professional institutions, whether they be called Clubs as in America, Unions as in France and Germany, or Institutes or Societies, as other similar professional bodies are here. At present there are, at the Railway Clearing House, meetings held periodically of the chiefs of the various Departments of practical railway work, the Goods Managers, the Superintendents, the Locomotive Engineers, and so forth. But these meetings are confined to a single representative of each company, they deal only with matter of immediate practical interest, and needless to say, their proceedings are "private and confidential." For educational purposes they are absolutely valueless. What we want is meetings for the reading of papers and discussion, where the keen-witted and ambitious young man, freed for once from the restraint of the deference due in his office hours to his superior officer, can ventilate his own ideas of possible improvement, and learn by open discussion how to distinguish between the theoretically desirable and the practically possible. Let me give one instance of what I mean. In the course of the last few years I have read, I suppose, more than a dozen reports by railway men on their visits to American Railways. Each of them might have furnished an admirable text for an evening's debate, and if published, as they might

have been, in the proceedings of some Railroad Club, would have been a source of information and instruction to railway men all over the country. In the whole dozen I do not suppose there was a page that might not perfectly well have been cried from the house-top, but one and all they were labelled "private and confidential," and now they are duly pigeon-holed and accumulating dust in the various railway offices.

Let me mention one thing more. Except at the top, railway work is very badly paid, and young railway men cannot, as a rule, afford to buy many books, even if they did, which they usually do not, know the names of them. Yet I doubt if in all England there is a single library with as much as 100 volumes on railway subjects, assembled and catalogued together for convenient reference. After all, to a big institution, books are comparatively a small item of expenditure. Is it too much to ask that everywhere in England where railway lectures are given, there should be formed the nucleus of a working railway library, containing, not only books, but the principal professional journals of at least France, Germany and America, and that somewhere in England there should be one railway library, worthy to rank with that of the Interstate Commerce Commission, or the Leland Stanford University in America, or of the Ministry of Public Works in Prussia?

Lest my practical railway friends should accuse me of thinking that railway managers can be manufactured in class rooms and libraries, let me add one word more. I am far from suggesting that a curriculum such as I have sketched, even supplemented by opportunities for social instruction such as I have asked for, would, in itself, suffice to turn out practical railway managers. After all, practical experience is the best school, and for my own part I would be ready to acknowledge that I have learned as much about railway business in good sheds and shunting yards, as from all the books I have ever read. If life were long enough, if experience could be wide enough, a man might perhaps be left to work out his generalizations for himself solely from his own experience. But life is short, the railway business is vast, and its ramifications almost indefinitely far-reaching. No man can, in practice, know the work of all its departments of his own first-hand knowledge. The ordinary railway man, so far from being permitted to range at will through every department and collect his honey from every flower,

grows up and continues till middle age in a corner of a sub-department. He cannot have—in the nature of things it is impossible for him to have—a grasp of railway business as a whole. He must get, with the help of systematic professional instruction, his generalizations on the work of departments other than his own done for him. It is not as good as if he could do them for himself, but it is better for him than not to get them done at all.

England discovered railways, and for the first 40 years or so of railway history, the English railways unquestionably were a model to the world. We have lost that pre-eminence. In later years foreign observers have gone for their lessons, not to England, but to the United States. Quite recently, and not unreluctantly, our own railwaymen have done the same. This is no accident; it was inevitable in the nature of things. So long as railway management was pure empiricism, the self-reliance and the hereditary business capacity of Englishmen kept them in front. But empiricism is no more a match for trained scientific methods than the superb courage of the Mahdi's troops was a match for discipline and breechloaders. The Americans appreciated the advantages of a professionally trained staff, with adequate statistics and scientific methods, a dozen years ago. A dispassionate observer, who knew the situation in the two countries, could have as safely prophesied that the American railways would ere long surpass ours in efficiency and economy, as a trained soldier with access to all the facts, could have foretold the defeat of Russia by Japan. Fortunately for us, in this field of contest, the success of America does not imply the defeat of England. We have been beaten, not by superiority of men, but by superiority of methods. We have got the men. For my own part with no reflection on America, and with nothing but gratitude for all it has taught me, I am prepared to say our men are splendid. But in the absence of adequate professional education, it is impossible that they should do themselves justice. Let us hope, and we are entitled to hope, that the Railway School of the University of Liverpool, inaugurated to-night, will take a leading part in helping the rising generation to show all that they are capable of.